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Notice of Allowability

Application No.

10/724,141

Examiner

Thanhha Pham

Applicant(s)

SCHWALBE ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/28/2005 and interview dated 12/06/2005.
2. ☒ The allowed claim(s) is/are 1-15 and 17-20.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____



Thanhha Pham

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with James Kesterson on 12/06/2005.

The application has been amended as follows:

- In claim 1,
 - line 7, "the resist layer" to – the photosensitive resist layer –
 - line 16, after "obtained" insert -- , the incinerating minimizing total lost of the patterned dielectric layer in a subsequent step of cleaning –
- In claim 11,
 - line 7, change "the resist layer" to – the photosensitive resist layer –
 - line 13, after "a forming gas," insert – the oxygen gas being present in an amount of between approximately 60% and 40% by volume and the forming gas being present in an amount of between 40% and 60% by volume, --
 - line 14, after "obtained" insert -- , the incinerating minimizing total lost of the patterned dielectric layer in a subsequent step of cleaning –
- In claim 15,
 - line 6, change "and/or" to – and –
 - line 8, change "the resist layer" to – the photosensitive resist layer –

line 15, change "approximately 60% or less" to -- between approximately 60% and 40% --

line 16, change "approximately 40% or more by volume" to -- between 40% and 60% by volume, --

lines 16-17, change "so that the patterned dielectric layer is obtained, wherein the patterned dielectric layer is a contact hole" to -- so that a patterned dielectric layer is obtained to form a contact hole, the incinerating minimizing total lost of the patterned dielectric layer in a subsequent step of cleaning --

- In claim 17,

line 4, change "a patterned dielectric layer" to -- the patterned dielectric layer --

Allowable Subject Matter

2. Claims 1- 15 and 17-20 are allowed.
3. The following is an examiner's statement of reasons for allowance:
 - Recorded Prior Art fails to disclose or suggest the combination of the process steps of method for patterning dielectric layers on semiconductor substrate as recited in the base claims 1 and 11 including: incinerating the resist mask in an oxygen plasma, the incinerating being carried out at a temperature which is selected to be approximately 200oC or lower, and the oxygen plasma being generated from a gas which at least contains oxygen gas and a forming gas, the oxygen gas being present in an amount of between approximately 60% and 40%

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by volume and the forming gas being present in an amount of between 40% and 60% by volume, so that a patterned dielectric layer is obtained, the incinerating minimizing total lost of the patterned dielectric layer in a subsequent step of cleaning; and cleaning the patterned dielectric layer using aqueous dilute hydrofluoric acid.

- Recorded Prior Art fails to disclose or suggest the combination of the process steps of method for a patterning dielectric layer on a semiconductor substrate as recited in the base claim 15 including: incinerating the resist mask in an oxygen plasma, the incinerating being carried out at a temperature which is selected to be approximately 200oC or lower, and the oxygen plasma being generated from a gas which at least contains oxygen gas and a forming gas, the oxygen gas being present in an amount of between approximately 60% and 40% by volume and the forming gas being present in an amount of between 40% and 60% by volume, so that a patterned dielectric layer is obtained to form a contact hole, the incinerating minimizing total lost of the patterned dielectric layer in a subsequent step of cleaning; and cleaning the patterned dielectric layer using aqueous dilute hydrofluoric acid.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Thanhha Pham